REMARKS

This communication is in response to the Office Action dated August 11, 2005. Claims 1-29 are pending in the present Application. Claims 1, 8, 15, 22 and 25 have been amended for clarification. Claim 30 has been added. Claims 1-30 remain pending in the present Application.

§102 Rejections

Claims 1, 8, 15, 22 and 25

For ease of review, Applicant reproduces independent claims 1, 8, 15, 22 and 25:

1. A method for correcting web deformation during a roll-to-roll process comprising:

initiating a roll-to-roll process involving a flexible web substrate;

detecting web deformation in the flexible web substrate during the roll-to-roll process; and

dynamically correcting the flexible web substrate based on the detected web deformation.

8. A system for correcting web deformation during a roll-to-roll process comprising:

means for initiating a roll-to-roll process involving a flexible web substrate;

means for detecting web deformation in the flexible web substrate during the roll-to-roll process; and

means for dynamically correcting the flexible web substrate based on the detected web deformation.

15. A roll-to-roll processing system comprising:

a web rolling mechanism;

a flexible web substrate coupled to the web rolling mechanism;

a plurality of sensors configured to dynamically detect deformation in the flexible web substrate;

at least one controllable mechanical component coupled to the flexible web substrate; and

a computer system coupled to the plurality of sensors and the at least one controllable mechanical component wherein the computer system includes logic for detecting deformation in the flexible web substrate; and

dynamically correcting the flexible web substrate based on the detected deformation.

22. A computer program product for correcting web deformation during a roll-to-roll process wherein the computer program product includes a computer usable medium having computer readable program means for causing a computer to perform the steps of:

initiating a roll-to-roll process involving a flexible web substrate;

detecting web deformation in the flexible web substrate during the roll-to-roll process; and

dynamically correcting the flexible web substrate based on the detected web deformation.

25. A method for correcting web deformation during a roll-to-roll process comprising:

utilizing optical markings on a flexible web substrate to detect the deformation in the flexible substrate;

comparing the detected deformation with a desired deformation;

generating an error signal based on the comparison; and

generating a correction signal to be utilized to dynamically ~~align~~ correct the flexible web substrate; and

dynamically correcting the flexible web substrate based on the correction signal.

The Examiner states:

> Claims 1-29 are rejected under 35 U.S.C. 102 as being anticipated by St. John et al (U.S. Patent No. 4,485,982).

Applicant respectfully disagrees. The present invention includes a method and system for correcting web deformation during a roll-to-roll process. The present invention includes controllable mechanical components that are capable of dynamically adjusting the planarity and dimensions of the web during the roll-to-roll process. By actively adjusting the web dimensions during the roll-to-roll process, the accuracy of the layer-to-layer alignment of successive patterning steps is greatly increased thereby enabling the production of complex electronic structures with lower overlap capacitance and higher resolution.

A first aspect of the present invention is a method for correcting web deformation during a roll-to-roll process. The method includes initiating a roll-to-roll process involving a flexible web substrate, detecting web deformation in the flexible web substrate during the roll-to-roll process and dynamically correcting the flexible web substrate based on the detected deformation.

A second aspect of the present invention is a roll-to-roll processing system. The processing system includes a web rolling mechanism, a flexible web substrate coupled to the web rolling mechanism, a plurality of sensors configured to dynamically detect deformation in the flexible web substrate, at least one controllable mechanical component coupled to the flexible web substrate and a computer system coupled to the plurality of sensors and the at least one controllable mechanical component wherein the computer system includes logic for detecting deformation in the flexible web substrate and dynamically aligning the flexible web substrate based on the detected deformation.

The Examiner states that the St. John reference anticipates the present invention. Applicant respectfully disagrees and asserts that the reference does not disclose the act of "...dynamically ***correcting*** the flexible web substrate based on the detected ***web deformation***..." as recited in amended claims 1, 8, 15, 22 and 28. The St. John reference discloses a web tracking system for a continuous web of material which is transported from a supply to a takeup means along a predetermined path via one or more processing stations and comprises aligned tracking indicia along at least one edge of the web. Means are provided to observe the tracking indicia as the web is transported along the system path and produce information either indicative of dimensional changes in the length and width of the web due to web shrinkage or expansion or indicative of a particular point along the length of the web useful at one or more of the processing stations in the system.

Applicant asserts that the Examiner is correct in asserting that the St. John reference discloses the alignment of a web substrate. However, Applicant asserts that the independent claims have been amended to recite the act of "...dynamically ***correcting*** the flexible web substrate based on the detected ***web deformation***...". Support for the amendments to these claims is found in the title of this application (METHOD AND SYSTEM FOR ***CORRECTING*** WEB DEFORMATION DURING A ROLL-TO-ROLL PROCESS). Alignment, as disclosed in the St. John refers to the alignment of the web substrate based on the detection of lateral and longitudinal changes in the web substrate. This is specifically disclosed in St. John col. 2, line 60 to col. 3 line 4:

> **Lateral and longitudinal dimensional changes in the web derived from observation of an aligned row of registration marks is indicative of changes in length, either expansion or shrinkage, of the web under observation. In this regard, it should be noted that coarse correction for lateral alignment of the web relative to a processing station due to web shifting in the system path can be accomplished by the lateral translation of the web supply roll while fine correction for lateral due to web expansion or shrinkage can be accomplished by the lateral translation of a processing station or a component at the station to recenter the station relative to the web.**

Applicant asserts that St. John implements a lateral translation (i.e. movement of the web substrate from side to side) in response to a misalignment and is limited to the detecting of global changes in the web.

In contrast, Applicant asserts that the disclosed embodiments of the present invention ***correct*** detected deformations in the web substrate as opposed to aligning the web substrate and are capable of not just correcting average changes but locally varying distortions essential for fine scale alignment of photolithographic features. Corrections to the web substrate are clearly distinguishable from alignments of the web substrate since corrections to the web substrate involve more than lateral and longitudinal alignment. Corrections deal with local and global web deformation forces that are based on detected changes in compression and/or relative stretch of the web substrate. Local correction involves detecting local deformations present on portions of the web that are not true for all of the web and subjecting the web to forces correcting the dimensions locally. Corrections do not simply involve translating the web in relation to processing but rather corrects both local and global shear, translation and dilation. Consequently, these corrections are made using mechanical components that provide perpendicular forces as well as lateral forces. An example of such a component is shown in Figure 6 (attached Exhibit A) of the present application.

Figure 6 is an illustration of a spherical nip configuration 600 that could be utilized in conjunction with an embodiment of the present invention. The configuration 600 shows a spherical nip 610 that is in contact with a flexible web substrate 620. The spherical nip 610 includes motorized equatorial drives 611,612 that rotate the spherical nip 610 in the desired direction of motion to impart arbitrary point displacements to the flexible web substrate 620. Also shown in configuration 600 is a spring-loaded counter roller 630.

The spring-loaded counter roller 630 provides a perpendicular force to the spherical nip 610 and is designed to prevent slippage of the spherical nip 610 and increase the forces that can be imparted to the web. The spherical nip 610 is electronically coupled to a computer system 640. Accordingly, the computer system 640 sends realignment signals to the spherical nip 610 thereby causing the spherical nip 610 and the spring-

loaded counter roller 630 to exert a compensatory stress on the flexible web substrate 620 to account for any detected deformation and skew. Applicant asserts that the St. John reference does not teach or suggest the implementation of comparable configuration.

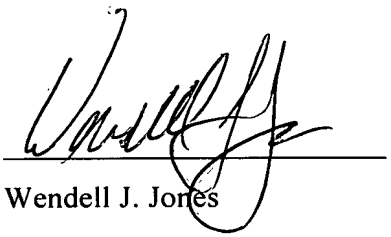
Consequently, Applicant asserts that correcting the web substrate, as recited in the independent claims of the present invention, is clearly distinguishable from the alignment of a web substrate based on latitudinal and longitudinal changes as disclosed by the St. John reference. Accordingly, independent claims 1, 8, 15, 22, 25 and 30 are allowable over the Examiner's proposed rejection.

Claims 2-7, 9-14, 16-21, 23-24 and 26-29

Since claims 2-7, 9-14, 16-21, 23-24 and 26-29 are respectively dependent on claims 1, 8, 15, 22 and 25, the above-articulated arguments with regard to independent claims 1, 8, 15, 22 and 25 apply with equal force to claims 2-7, 9-14, 16-21, 23-24 and 26-29. Accordingly, claims 2-7, 9-14, 16-21, 23-24 and 26-29 should be allowed over the Examiner's cited reference.

Applicant believes that this application is in condition for allowance. Accordingly, Applicant respectfully requests reconsideration, allowance and passage to issue of the claims as now presented. Should any unresolved issues remain, Examiner is invited to call Applicant's attorney at the telephone number indicated below.

Respectfully submitted,



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